DM 1: Write down the 4^{th} order Taylor polynomial of $\sqrt{x}$ centered at $x = 1$. Let $P(x)$ denote this polynomial. If $1 \le x \le 2$, what can you say about the size of $|\sqrt{x} - P(x)|$? Hint: Use the remainder term!

Solution:

Chapter 4: 2 (c): For full credit you must write your own version of Newton's method. Your function should have the signature

```
function [r,hist] = hw3newton(f,fp,x1,ftol,xtol,Nmax)

end
```

The input values are

- `f`, the function to find a root of.
- `fp`, the derivative function of `f`.
- `x1`, the first iteration value.
- `ftol`, the tolerance for stopping based of the value of `f`
- `xtol`, the tolerance for stopping based on changes in `x`
- `Nmax`, the maximum number of iterations

Your function should exit with an error if more than `Nmax` iterations are used. It should return whenever $|f(x)| < f_{\text{tol}}$ or $|x_n - x_{n-1}| < x_{\text{tol}}$.

The return values should be `r`, the estimate of the root's position, and `hist`, a list of all estimates starting with `x1` and ending with the final estimate `r`.

Test that your function works by finding three different ways to call it so that iteration stops for each of the three possible reasons.

To answer the problem in the textbook, you will want to call your functin with $x_{\text{tol}} = 0$ to ensure that only the f_{tol} condition is used to stop the iteration.

Chapter 4: 6 (a,b): Also, use your `hw3newton` function from the previous problem to compute the location of the minimum, and generate a plot that indicates that your computation succeeded.

Solution:
Part(a):

Solution:
Part(b):

Chapter 4: 7:

Chapter 4: 10: